C

PSYCHE

A JOURNAL OF ENTOMOLOGY

ESTABLISHED IN 1874

VOL. XXXIII FEBRUARY 1926 No. 1

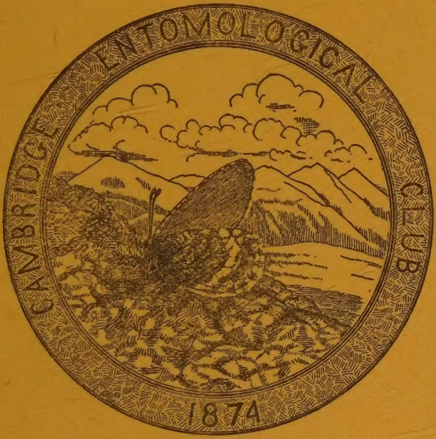


TABLE OF CONTENTS.

Notes on the Odors of Some New England Butterflies. *A. H. Clark* 1

The Strange Way in which the Vishnu Moth (*Trabala vishnu*) deposits her eggs in the Shape of Larvae. *Eric Mjöberg* 6

Death-feigning in *Anax junius* and Aeschna sp. *C. E. Abbott* 8

Some Notonecta from South America. *H. B. Hungerford* 11

A New Fossil Moth from Florissant. *T. D. A. Cockerell* 16

Note on the Hymenopterous Family Rhopalosomatidae. *C. T. Brues* 18

The Distribution of *Muscina pascuorum* Meigen in North America. *C. W. Johnson* 20

Recent Work by Gabritschevsky on the Inheritance of Color Varieties in *Volucella bombylans*. *C. E. Keeler* 22

Book Review. Herrick's Manual of Injurious Insects 27

CAMBRIDGE ENTOMOLOGICAL CLUB

OFFICERS FOR 1926

President	MR. W. L. W. FIELD
Vice-President	MR. O. E. PLATH
Secretary	PROF. J. BEQUAERT
Treasurer	MR. F. H. WALKER
Excutive Committee	MR. C. A. FROST MR. F. M. CARPENTER MR. P. J. DARLINGTON, JR.
Editor of Psyche	PROF. C. T. BRUES

EDITORIAL BOARD OF PSYCHE

EDITOR-IN-CHIEF

C. T. BRUES, HARVARD UNIVERSITY

ASSOCIATE EDITORS

C. W. JOHNSON,
Boston Society of Natural History.

NATHAN BANKS,
Harvard University.

A. L. MELANDER,
College of the
City of New York,

A. P. MORSE,
Peabody Museum,
Salem, Mass.

J. H. EMERTON,
Boston, Mass.

J. G. NEEDHAM,
Cornell University.

W. M. WHEELER,
Harvard University.

PSYCHE is published bi-monthly, the issues appearing in February, April, June, August, October and December. Subscription price, per year, payable in advance: $2.00 to subscribers in the United States, foreign postage, 25 cents extra, Canada 15 cents, Single copies, 40 cents.

Cheques and remittances should be addressed to Treasurer, Cambridge Entomological Club, Bussey Institution, Forest Hills, Boston 30, Mass.

Orders for back volumes, missing numbers, notices of change of address, etc., should be sent to Cambridge Entomological Club, Bussey Institution, Forest Hills, Boston, 30, Mass.

IMPORTANT NOTICE TO CONTRIBUTORS.

Manuscripts intended for publication, books intended for review, and other editorial matter, should be addressed to Professor C. T. Brues, Bussey Institution, Forest Hills, Boston, 30 Mass.

Authors contributing articles over 8 printed pages in length will be required to bear a part of the extra expense, for additional pages. This expense will be that of typesetting only, which is about $2.00 per page. The actual cost of preparing cuts for all illustrations must be borne by contributors; the expense for full page plates from line drawings is approximately $5.00 each, and for full page half-tones, $7.50 each: smaller sizes in proportion.

AUTHOR'S SEPARATES.

Reprints of articles may be secured by authors, if they are ordered before, or at the time proofs are received for corrections. The cost of these will be furnished by the Editor on application.

Entered as second-class mail matter at the Post Office at Boston, Mass. Acceptance for mailing at special rate of postage provided in Section 1103, Act of October 3, 1917, authorized on June 29, 1918.

PSYCHE

A Journal of Entomology

Volume XXXIII

1926

EDITED BY CHARLES T. BRUES

Published by the Cambridge Entomological Club, Bussey
Institution, Forest Hills, Boston 30, Mass., U. S. A.

Printed by The St. Albans Messenger Company
St. Albans, Vermont.

PSYCHE

VOL. XXXIII. FEBRUARY 1926 No. 1

NOTES ON THE ODORS OF SOME NEW ENGLAND BUTTERFLIES.

Austin H. Clark.

Smithsonian Institution, Washington, D. C.

Considering the strength of the odors exhaled by one or both sexes of many of our common butterflies it is quite extraordinary that they have received so little attention.

The following notes were made chiefly at Manchester and Essex, Massachusetts. It is quite possible that in certain species there will be found to be a geographical variation in the strength or type of the odor which may or may not be correlated with variation in color or in other characters. It is also quite possible that further investigation will show in certain types more or less dimorphism in the odors such as has been reported in the southern *Papilio polydamus*.

The noses of my two young sons being much more acute than mine, their assistance in experimenting with some scores of captured butterflies was of the greatest value; in fact some of the odors readily detected by both of them I was unable to perceive at all. Ordinarily the testing of butterflies for odors is an interesting and pleasant task; but one must always be prepared for most unwelcome surprises as in the case of the females of the fritillaries.

Close observation of the courting of the argynnids and of *Eurymus philodice* has led me to believe that the male odors are sexual stimulants pure and simple, while the female odors, always disagreeable in varying degrees and sometimes nauseating, are protective.

Speyeria idalia (Drury).—The odor of the male is uniformly strong and resembles that of the males of *Argynnis cybele* and *A. aphrodite*, but is sweeter and more flowery. Mr. Scudder compared it to musk, but it is to me more flowery than musk.

Argynnis cybele (Fabricius).—The males have a faint to strong spicy odor resembling sweet flag or sandal-wood which can always be detected and is sometimes strong enough to be evident when the insect is fluttering in the net. It is strong in one individual out of every four or five and is often exceptionally strong in very worn examples. Very fresh insects appear always to be nearly, sometimes indeed quite, odorless. It appears to take some time after the wings are fully formed and functional for the odoriferous secretion to become diffused sufficiently to give the characteristic fragrance.

Mr. Scudder specifically stated that both this species and the following are scentless. It is probable that he examined only individuals too recently emerged for the scent to have become effectively distributed.

In the females the wings are odorless, but the pair of short blunt stout soft orange appendages which on pressing the abdomen are extruded from between the last two segments dorsally gives off a powerful nauseating odor recalling that of the osmateria of the caterpillars of *Papilio polyxenes*.

The females of our fritillaries are larger and more conspicuous than the males and at the same time less shy with a less swift and less erratic flight. They also appear to be much longer lived, for by the end of August all the still fairly numerous individuals remaining are females busily engaged in searching out their food plants and seldom seen on flowers. It is a reasonable inference that in these butterflies both sexes are protected to an appreciable extent by the formidable abdominal glands of the females.

Argynnis aphrodite (Fabricius).—The odors of both sexes of this butterfly as found in this region exactly resemble those of the corresponding sexes of *A. cybele*.

Brenthis montinus Scudder.—Professor John H. Gerould writes me that he has noticed an odor in this species similar to that in the two preceding. I have made no personal observations on it.

Brenthis myrina (Cramer).—No odor was detected in either sex; but the females have the same odoriferous organs as are found in the females of related types which undoubtedly are the same in function.

Junonia cœnia Hübner.—In the large and handsome dark variety with the under surface of the wings dull pinkish red which is the commonest about Washington in the fields where the food plant (*Agalinis purpurea*) is abundant the males have a rather strong sweet odor which is sometimes evanescent. This variety has curiously soft wings and always feels as if recently emerged. It is sluggish, and rarely flies for more than fifty feet or so.

The variety occurring in New England is much smaller, distinctly brown above and buffy gray below. The wings are hard and brittle and most individuals caught are damaged in contrast to the other form in which broken specimens are relatively rare. It is exceedingly alert and active, a much stronger flier than the other, less easily visible on the wing and much more difficult to catch. Specimens from Washington are indistinguishable from those from Massachusetts. The males, so far as I can find, are scentless; at any rate the odor is much less pronounced than in the other type.

About Washington the small light active form is found sparingly with the other, from which it differs in keeping mostly well above the ground resting on the tops of the higher plants and quickly darting off on the slightest provocation. It is much more frequently to be seen on barren hillsides, about the city parks and streets, and generally in unfavorable localities where the other is not found.

One might reasonably infer that this well marked variety is a special form particularly fitted for long continued flight and therefore especially adapted for distributing the species.

Vanessa cardui in New England also appears to have a special form distinctively colored on the under side with corresponding habits. This form flies in a straight line usually from ten to fifteen feet above the ground keeping on till it is out of sight in contrast to the usual type which in its habits is much like *V. huntera.*

In *Feniseca tarquinius* it would seem that certain individuals are specialized as migrants. These fly slowly in a straight line across the fields usually a foot or so above the grass tops for long distances; in fact I have never seen them rest. Typically this insect's flight is most erratic suggesting a small and very active satyrid, with frequent rests.

Basilarchia archippus (Cramer).—Both the boys reported in this species a pronounced and disagreeable odor which the younger compared with that of *Anosia plexippus* females. It is not a little curious that this butterfly should both look and smell like this larger form. But the flight of the two is different and one can easily tell them on the wing at any distance.

Anosia plexippus (Linné).—The females have a rather strong and disagreeable odor resembling that of cockroaches or of carrots. The males have the same odor, but in them it is very faint and is overlaid with a faint very sweet odor like that of milkweed or red clover flowers.

Eurymus philodice (Godart).—The males have a distinct and uniformly strong odor resembling that of sweet grass or sweet hay. The females seem to be odorless.

Eurema euterpe (Ménétries).—The males, in spite of their diminutive size, have a pronounced fragrance similar to that of the males of the preceding species but sweeter and more flowery.

Papilio polyxenes Linné.—The males have a faint sweet odor resembling that of carrot flowers which is very pleasant. Apparently an identical odor is found in the males of the European *P. machaon.*

Two males examined in Washington had a strong sweet flowery odor of the same type.

Papilio glaucus Linné.—The males all have a sweet flowery odor varying from faint to fairly strong which resembles that o the males of *P. troilus* though it is never so pronounced. Th females have a disagreeable odor pungent in quality resemblin rubber cement or creosote which is very strong in some and ap parently stronger in the females taken about Washington than in those taken in New England. The same odor can sometimes be detected in the males, though very faintly.

Papilio troilus Linné.—The males have a distinct and rather strong sweetish odor difficult to describe but exactly resembling that of Nabisco or Huntley and Palmer's honey biscuits.

Laërtias philenor (Linné).—From observations made in Washington it was found that the males have a sweet flowery odor similar to that of the males of *Papilio polyxenes* though not so strong. The females have a strong pungent and disagreeable odor.

Mr. W. H. Edwards reported a disagreeable odor in this species but did not give the sex of the individual examined. Mr. Scudder very carefully investigated a specimen fresh from the chrysalis and found no odor. Mr. Edward's example undoubtedly was a female. Mr. Scudder's, which was a male, was probably too fresh for the odor to have become detectable.

THE STRANGE WAY IN WHICH THE VISHNU-MOTH (*TRABALA VISHNU*) DEPOSITS HER EGGS IN THE SHAPE OF LARVÆ.[1]

BY ERIC MJÖBERG.

In the small residential town of Kuching, Borneo, an invasion of voracious caterpillars in the garden and house of one of the residents was reported to me in October 1924. Certain plants were entirely defoliated and a large number of large hairy caterpillars of the usual Lasiocampid type were seen crawling about everywhere, even entering the rooms of the house and causing much inconvenience and annoyance. Obviously a mass propagation due to favorable circumstances had taken place. Ordinarily *Trabala vishnu* is a moth of rare occurrence; even in the rich collections of the Sarawak Museum only some few specimens were to be found.

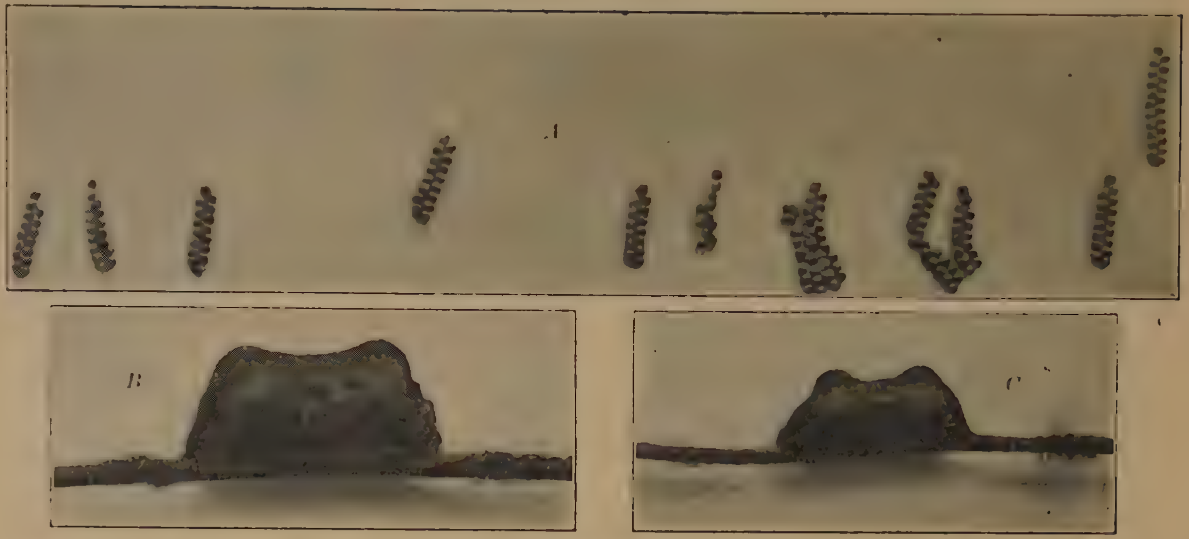
As the larva has already been described and figured, I shall not consider it in the present note.

A fertilized female was temporarily placed by me in an empty paper box and left over night. On opening the box on the following day I was very much surprised to see beside the moth, a considerable number of larvæ on the sides. I thought it very strange to begin with, but a somewhat closer examination soon revealed the fact that what I had taken for larvæ consisted of eggs laid in two parallel rows with an odd egg at the top. Furthermore, the mother had arranged it so that a darkly pigmented spot on each egg was always directed outwards with the effect that two dark longitudinal lines were formed, reminding one of the condition so often found in caterpillars. When I add that the mother had covered the egg strings with hairs from her own body, it is easy to understand that these completely conveyed the impression of being small hairy caterpillars.

On plate 1, A, a photograph of the eggs found in the box is reproduced. There are altogether 13 string, 8 laid separately and 5 more or less joined together. In nearly every string an

---

[1] Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 258.



MJÖBERG—OVIPOSITION OF VISHNU MOTH

A. Eggs of the Vishnu Moth (*Trabala vishnou*) laid in two parallel rows with one odd egg at the top, and covered with hairs by the mother, thus giving a complete impression of being hairy larvae. B. Cocoon of male. C. Cocoon of female.

odd egg is found at the top, representing a head. All are equally covered with short hairs and on every string there are two longitudinal rows of dark spots along the outer margin.

That the mother really has displayed a tendency to imitate the head of a caterpillar by placing one single egg on the top seems to be evidenced not only by the fact that in all strings there is an odd top egg but also that in strings no. 2, 5, 6, 7 and 10 (from left) there are two top eggs, one on top of the other one, whereas at the lower end of each string there seems to be no marked tendency to place an odd egg (except no. 3).

The longest egg string is no. 13 with 22 eggs. It is a strange fact that most of the other strings show two parallel rows of 7 eggs in each with 1-2 single top eggs.

In order to find out whether this peculiar way of depositing the eggs in the shape of larvæ was only a queer habit in this individual case or really a specific habit, I isolated six more fertilized females and awaited the result. In all cases the females laid their eggs in exactly the same way. Two of the females under observation were kept in very large cases, but the eggs were found to be laid in a strikingly singular way. One or two top eggs were always to be seen and the same arrangement with the dark spots forming two longitudinal lines was also observed.

We may therefore safely conclude that this peculiar way of depositing the eggs in larva-like shape is a characteristic of *Trabala vishnu.*

The advantage of this form of "mimicry," if we may use this term, is obvious. It is a well-known fact that hairy caterpillars are distasteful and discarded by most birds, the insects' greatest enemies. Only the cuckoos seem to form an exception to the rule. Undoubtedly the eggs laid in this way are better protected than if laid separately or in disorderly heaps as is the case with most Lasiocampids, and it seems to be fairly clear that the mother in this case by making the unprotected earliest state of the development so strangely similar to hairy distasteful larvæ, has solved the problem of protecting her offspring *ab ovo* in a more effective way.

DEATH FEIGNING IN *ANAX JUNIUS* AND AESCHNA SP.

By C. E. Abbott,
Elgin, Illinois.

In reviewing the literature on death feigning of insects, I was unable to find anything relating to this peculiar behavior in dragon-fly larvæ. The Severins have worked with two species of water-bugs, but this, and the work of Holmes on another aquatic Hemipteron, Ranatra, are the only references available on this phenomenon in aquatic insects. The theory of Holmes concerning the death feigning of insects is an interesting one. He regards it as an overdeveloped thigmotaxis.

The idea of working with Anax and Aeschna readily suggested itself because of the ease with which these insects were obtained and the fact that work was being done with them in quite another group of experiments. It was observed that, when the animals were taken from the water and placed on a solid object, they remained motionless, with the cloacal valves closed, and their legs pressed closely against their sides. To put the

INDIVIDUAL TESTS

Individuals

Trials	I	II	III	IV	V	VI	VII
1.	1 min. 30 sec.	1 min. 45 sec.	no response	2 min. 30 sec.	9 min.	14 min. 30 sec.	17 min.
2.	30 sec.	1 min. 45 sec.	2 min. 45 sec.	4 min. 30 sec.	5 min. 30 sec.	18 min.	9 min. 45 sec.
3.	18 min.	5 min.	5 min.	2 min. 15 sec.	10 min. 45 sec.	7 min. 30 sec.	22 min.
4.	7 min. 45 sec.	13 min. 30 sec.	3 min. 30 sec.	1 min.	4 min.	13 min. 30 sec.	2 min.
5.	2 min.	11 min.	5 min.	2 min.	1 min. 30 sec.	2 min.	3 min.
6.	9 min.	3 min. 30 sec.	12 min. 45 sec.	1 min. 30 sec.	6 min. 10 sec.	3 min.	

Duration of Successive Feints

Individuals

Trials	A	B	C
1.	2 min. 30 sec.	7 min.	12 in.
2.	1 “	6 “ 30 sec.	11 “
3.	30 “	4 “	1 “
4.	30 “	3 “	2 “ 30 sec.
5.	35 “	3 “	
6.		1 “	
7.		15 “	
1.	5 min. 30 sec.	5 min. 30 sec.	9 min. 30 sec.
2.	3 “	1 “ 30 “	4 “
3.	1 “ 30 “	3 “	13 “
4.	30 “	1 “	4 “
5.		45 “	4 “
6.		5 “	2 “
7.		3 “	1 “
8.		2 “	
9.		2 “	
10.		1 “	
1.	2 min.	6 “	6 min. 30 sec.
2.	1 “	2 “	3 “
3.	1 “	1 “	3 “
4.	30 sec.	1 “	1 “
5.	45 “	45 sec.	1 “
6.	45 “		30 “
7.	15 “		1 “
8.	45 “		
9.	45 “		
10.	45 “		

animal back into this condition, it was only necessary to gently stroke its sides. In experimenting, the larvæ were placed on wet sand. One group of tests was made simply to determine the length of individual feints, and another set was made to discover the duration of successive feints.

It thus appears that the duration of individual feints varies a great deal, and that the duration of feints in rapid succession tends to decrease. This is in accord with what is known of the phenomenon in other insects.

I wish to take this opportunity of thanking Dr. W. S. Marshall of the Zoology department for his co-operation and suggestions in this and other experimental work.

LITERATURE.

Holmes, S. J.

The instinct of feigning death. Pop. Sci. Mon. LXXII, p. 179. (1908).

Severin, H. H. P. and H. C.

An experimental study of the Death-Feigning of *Belostoma* (=*Zaitha* Auct.) *flumineum* Say and *Nepa apiculata* Uhler. Behavior Monog, I, 20.3, 44 pps., 1 pl. (1911).

SOME NOTONECTA FROM SOUTH AMERICA

By H. B. Hungerford,
University of Kansas, Lawrence, Kansas.

The lack of precise external structural characters in the Genus Notonecta has led to almost hopeless confusion of the South American species. Fieber, unable to limit the range of variation within a species proposed many varietal names. Kirkaldy[2] in his "Revision of the Genus Notonecta" disposed of a number of specific names by sinking them into synonomy This procedure has given a false impression of the relation of North and South American Notonecta. Kirkaldy, for illustration, considered the range of the most common North American *Notonecta undulata* Say to include Chile, South America. This was possible because he thought *N. virescens* Blanch. was only a variety of *N. undulata* Say. An examination of the genital capsules of the males will show plainly that they are distinct species. Other features less demonstrable but constant separate these species. *N. virescens* Blanchard is a good species.

Prior to Fieber's Rhynchotographieen Guérin[3] 1844 described *N. bifasciata* from "les bords de la Platta." Then the same year that Fieber's paper appeared (1852) Blanchard's *N. virescens* was described. It appears that this species from Chile was unknown to Fieber. Fieber in his 1852 paper first describes *N. nigra*, a large and readily recognized species, the types of which are still in Vienna. Under *Notonecta rugosa* (=*N. insulata* Kirby) after naming three varieties from Long Island, Baltimore and Pennsylvania, he adds the variety *basalis* from Brazil. Under *N. Variabilis* he describes 4 varieties, the first one from Brazil and Porto Rico, the second from Baltimore, and the third and fourth from Brazil. I have not seen specimens of the

---

[1] Fieber, Franz Xavier: Rhynchotographieen-Prag (From Acten der Königl. Gesellschaft der Wissenschaften, Vol. V, Pt. 7.)

[2] Kirdaldy, G. W.: Revision of the Notonectidae Part I. Introduction and Systematic Revision of the Genus Notonecta. Trans. Ento. Society of London. 1897.

[3] Guérin-Ménéville, Félix Edouard: Iconographie du Règne Animal de G. Cuvier.....Paris-1829-1844.

common United States species which we call *N. variabilis* from Brazil and am inclined to believe that it does not exist there. If the first named variety of Fieber's *N. variabilis* is to be taken as the type, I should be inclined to the opinion that the name *maculata* which Fieber gave to his variety from Baltimore should be used as Fieber's name for our North American species. His description fits our insect very well. The size is too small to be applied to our common *N. undulata* Say which Fieber appears to have known only from the literature describing this insect under other names. It happens, however, that the name *N maculata* was employed previously by Fabricius. I suggest the name *Notonecta lunata* for the North American species which we have hitherto called *N. variabilis*. A figure of the male genital capsule is shown on Plate XXXI, Fig. 11 of Kansas University Science Bulletin No. XI.

Under *N. polystolisma* Fieber describes 5 varieties, four of them from Brazil and probably various color phases in the development of the color pattern of one species. One variety which he called *sellata* came from Buenos Aires and is most certainly *N. bifasciata* Guérin. Kirkaldy and Bueno call *N. polystolisma* Fieber a synonym of *N. bifasciata* Guérin.

There have come to my hand for determination several small species of Notonecta from South America. No one seems to have given these insects the close scrutiny necessary to separate the species. As will be seen by the drawings submitted, there are distinct structural characters. There are also characteristic color patterns, but much confusion can arise because of the teneral specimens taken in various stages of pigmentation. It also happens that in some of these species there are two color phases—the pale immaculate forms as well as the nearly black forms, a condition similar to that of the well known *Notonecta shooteri* Uhler.

Notonecta bicirca sp. nov.

Size: Length, 9 mm.; width, 3 mm. Some are a little larger and some a little smaller than the measurements given.

Color: General view shows head, prothorax and legs yellowish. Scutellum and two circles on hemelytra black. Closer inspection reveals posterior half of pronotum darkened by black thorax beneath, an elongate yellow spot on lateral margins of scutellum. Hemelytra yellowish-white covered with silvery hairs and with the following typical maculations: Submarginal band of black on base of corium; distal end of clavus black; base of corium; distal end of clavus black; broad transverse black band traversing distal third of corium and base of membrane and embracing a small orange-yellow spot at end of embolium and entirely surrounding a much larger nearly circular spot above. The general effect produced is that of two black circles surrounding orange-yellow spots upon the insects, the lateral orange yellow spots upon the margins of the wings and opening upon the embolial sutures being unnoticed.

Structural characteristics: The eyes farther apart at synthlipsis than in others of this group of species. Vertex: synthlipsis : : 10 : 4. Anterior width of pronotum : posterior width of pronotum : : 23 : 33.. The genital capsule of the male is shown on Plate II, Figure 1.

Described from 50 specimens from Chile. Taken by Doctor Alfredo Faz. 15 of them from Santiago and the others from Termas Cauquenes. Holotype, allotype and some paratypes in author's collection. Others in United States National Museum.

Notonecta disturbata sp. nov.

Size: Length, 8 mm.; width, 2.9 mm.

Color: Of two color phases. One yellowish-white throughout. The other with yellowish-white head, anterior half of pronotum and legs; basal half of hemelytra and tip of membrane white; scutellum and remainder of hemelytra black.

Structure: The eyes fairly close at synthlipsis. Vertex: synthlipsis : : 10 : 2.3. The width of the eye at base less than width of vertex. Sides of pronotum convergent. Anterior width of pronotum: posterior width of pronotum : : 19 : 29. The genital capsule of the male is shown Plate II, Figure 2.

Described from specimen belonging to São Paulo Museum, Brazil.

Notonecta minuta sp. nov.

Size: Length, 7.2 mm.; width, 2 mm.

Color: General view shows head, pronotum, legs and basal third of hemelytra yellow. Scutellum and distal two-thirds of hemelytra black with tips of membrane yellowish. Upon closer study there are seen to be enclosed in the broad black area across the hemelytra four small irregular orange yellow spots of nearly equal size. On one of the three specimens there are ill defined yellowish spots near the base and at the tip of the scutellum.

Structural characteristics: Vertex : synthlipsis : : 9 : 2.1. The width of eye at base equal to the width of vertex. Interior width of pronotum : posterior width of pronotum : : 19 : 26. The genital capsule of the male is shown on Plate II, Figure 7.

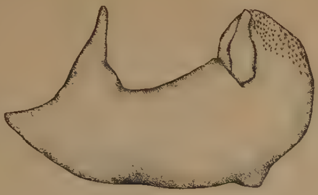
Described from specimens in the Carnegie Museum bearing the label, "Prov. del Sara, Bolivia, 450 m. J. Steinbach."

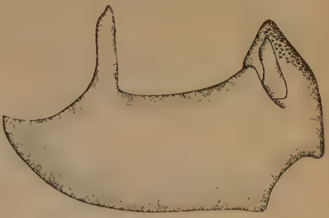
Notonecta pulchra sp. nov.

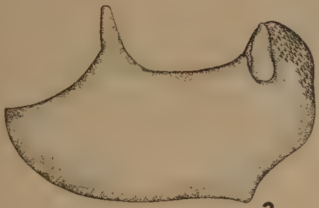
Size: Length, 8 mm.; width, 3-mm.

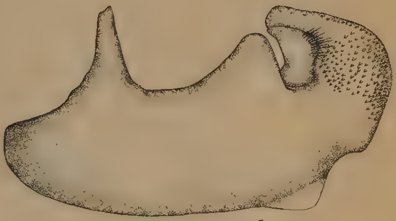
Color: Head, anterior half of pronotum, and legs yellow. Scutellum and hemelytra black save two pale spots at base of wings and an orange, irregular, transverse band at end of corium. Silvery hairs on hemelytra. A beautiful and striking species.

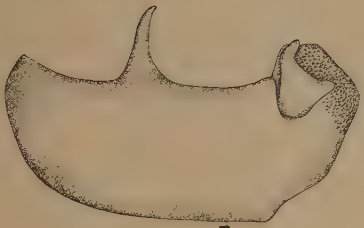
Structural characteristics: Vertex : synthlipsis : : 11 : 3. The vertex being broader than the width of eye at its base. The anterior width of pronotum : posterior width of pronotum : : 22 : 32. The genital capsule of male is shown on Plate II, Figure 3. Villa Rica by Mr. F. Schade. Holotype, allotype and many paratypes in author's collection. Paratypes also placed in United States National Museum.

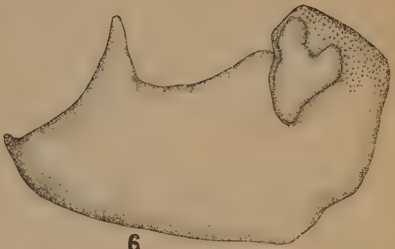

1

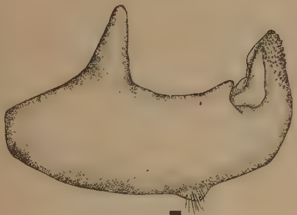

2

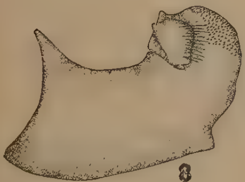

3

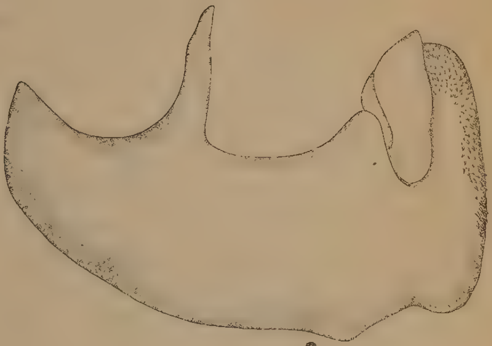

4


5


6


7


8


9

HUNGERFORD—NOTONECTA

Notonecta polystolisma Fieb. var. **spatulata** var. nov.

Fieber described five varieties under this species, one of which is quite certainly *N. bifasciata.* The other four are from Brazil and appear to be stages of pigmentation of a single species. Three of them he describes as having the "Schild gelblich." The species which I have may be related to them, but since it does not fit any of his descriptions it seems best to give it at least a varietal name. In the twenty specimens I have before me the scutellum is typically black and none of them surpass 4 lines in length. The vertex : synthlipsis : : 10 : 3. The anterior width of pronotum : posterior width of pronotum : : 23 : 35. The genital capsule of male is shown on Plate II, Figure 9. Described from 20 specimens from São Paulo, Brazil. Holotype, allotype and some paratypes taken at Ypirango, S. A. by R. Spitz. Others from São Paulo, Brazil, by unknown collector. Holotype, allotype, and some paratypes in author's collection. Others in the Museum of São Paulo.

Notonecta bifasciata Guér.

I have this species from Paraguay and various places in Argentina. The genital claspers in the male are quite different from any of the other species of this size (see Plate II, Figure 5.) It appears to be a common and abundant species.

Description of Plate II.

Notonecta bicirca sp. nov. Chile. Figure 1.
Notonecta disturbata sp. nov. Brazil. Figure 2.
Notonecta pulchra sp. nov. Paraguay. Figure 3.
Notonecta bifasciata Guér. Argentina. Figure 5.
Notonecta minuta sp. nov. Bolivia. Figure 7.
Notonecta polystolisma Fieb. var. *spatulata* var. nov. Figure 9,

Figures 4, 6 and 8 are of previously named species but not of this series.

A NEW FOSSIL MOTH FROM FLORISSANT.

By T. D. A. Cockerell,

University of Colorado, Boulder, Colo.

Many years ago, a fossil insect, supposed at the time to belong to Trichoptera, was found by Mr. Geo. N. Rohwer at Station 14 in the Miocene Shales of Florissant, Colorado. By some oversight, it had not been studied until yesterday, when I took it out to show to some students as an example of a fossil caddis-fly. A little examination revealed unexpected characters, and upon close study it was found that we had no caddis, but a moth. With the higher power of the binocular it was easy to see the scales, which thickly covered the anterior wings. On one side the wings are spread, so that their outline can be clearly seen; but I cannot make out the venation of the hind wings, nor that of the anal area of the anterior pair. It is also difficult to see exactly the condition at the apex of the cellula intrusa, but I believe I have drawn it correctly, in which case it presents no unique features. The genus may be definitely referred to the Cossidæ, and the general aspect is not unlike that of species of *Zeuzera*, *Givira* or *Comadia*. The abdomen, which I have drawn thick and short, is evidently lacking the apical part, and it may well have been long as in most existing Cossidæ.

Adelopsyche new genus

Rather small, thick bodied moths, the anterior wings long, with subparallel margins, broadly rounded at apex, heavily scaled, without spots or bands, but probably finely speckled. Scales fairly broad, suboval or more elongate, apically bidentate. Veins strong, basally stout; R_1, leaving common stem about as far from radial cell as length of that cell; radial cell small, cuneiform, emitting the quite simple R_2 and R_3; from the end of the cell (in the sense of lepidopterists,) and above the median cell or cellula intrusa, arise R_4, R_5 and M_1, the first two (which are simple to the end) well apart, but R_5 and M_1 from a common point; median cell short, its lower apical corner emitting M_2; M_3, Cu_{1A} and Cu_{1B} (in sense of Tillyard) coming off as in related genera, Cu_{1A} distinctly nearer to M_3 than to Cu_{1B}.

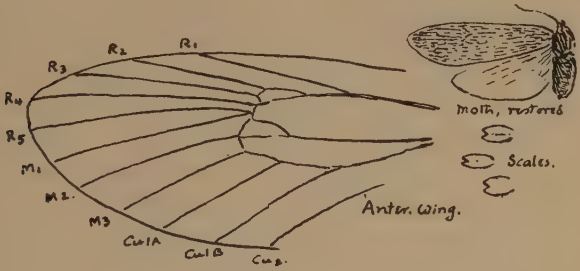


FIG. 1. ADELOPSYCHE FRUSTRANS SP. NOV.

Adelopsyche frustrans new species.

Anterior wing 15 mm. long and 4.5 broad, probably brown or dark gray in life; hind wing about 9.7 mm. long; width of thorax and abdomen, which are dark, nearly 4 mm.; legs not very robust.

In having the veins R_2, R_3, R_4 and R_5 all arising separately, this differs from the American genera (which are well figured by Barnes and McDunnough) and resembles the Australian genus *Macrocyttara* Turner (Trans. Ent. Soc. London, 1918, p. 169). It differs at once from *Macrocyttara* in having R_1 arising before the radial cell (as in *Givira* and other genera), and R_4 and R_5 arising below it. The separate origin of R_1 is considered by Jefferis Turner to be more primitive than the condition in *Macrocyttara*. Outside of *Macroscyttara*, the nearest allies of our fossil are *Cossodes* (Australia) and *Dudgeona* (Australia, India, Africa); these however are very distinct. The fossil genus *Gurnetia* (Cockerell. Ann. Mag. N. Hist. June 1921, p. 472), from the Isle of Wight, agrees in having the branches of the radius separate, while R_5 and M_1 come from beneath the radial cell. Cu_1 and Cu_2 of my figure of *Gurnetia* are Cu_{1A} and Cu_{1B} of Tillyard.

NOTE ON THE HYMENOPTEROUS FAMILY RHOPALOSOMATIDÆ.[1]

By Charles T. Brues.

During the course of a study of African Braconidæ, I find in a collection sent by E. C. Chubb, Director of the Durban Museum, a specimen of the Rhopalosomatid genus Paniscomima Enderlein.

A comparison of this species which proves to be the type of the genus, *P. erlangiana,* with the American Rhopalosoma enables me to indicate the relation between these two genera and to Morley's *Rhopalosoma abnorme* from India which very evidently represents another genus. It thus appears that this aberrant family includes three genera, each characteristic of a different zoological region, one from America, another from Africa and a third from India.

Paniscomima erlangeriana Enderlein

Zool. Anz., vol. 27, p. 465 (1904)

There is a single male from Widenham, Natal, December 14, 1914 (A. L. Bevis)

Enderlein based his genus Paniscomima on a single female from Somaliland and all of the characters which he gives to separate it from Rhopalosoma are not valid since he was obliged to rely on Westwood's description and figures. I find on a careful comparison of the present African specimen with specimens of *Rhopalosoma pœyi* Cress, collected in Haiti by Dr. Wm. M. Mann that several of Enderlein's differential characters (*loc. cit.*) do not really exist since the labial palpi, parapsidal furrows, tibial spurs and obsolete second recurrent nervure are essentially similar in the two. However as set forth in the following key, there are several differences which seem to be of sufficient weight to retain Paniscomima.

A comparison of Morley's description of the Indian *Rhopalosoma abnorme* (Trans. London Entom. Soc. 1910, p. 386) shows that it is undoubtedly entitled to generic rank. The strongly

---

[1] Contribution from the Entomological Laboratory of the Bussey Institution Harvard University, No. 256.

antefurcal nervulus is a very unusual character (shown clearly in Morley's figure also) and the absence of the strigil on the hind legs of the male is peculiar to the Indian form. The abdomen is described as subsessile with the first segment only twice (♂) or three times ♀; as long as broad at apex, a condition quite different from that in the American or African forms. In the latter character, however, the description and figure do not agree, but as the petiole is very carefully described, it seems probable that the figure is somewhat out of proportion. Morley overlooked *Paniscomima* and hence makes no comparison between it and his own species. These two are more closely similar in possessing simple claws, but the form of the abdomen, strigil and venation serve easily to distinguish them.

As stated elsewhere (Psyche, vol. 29, p. 107, 1922) I am unable to agree with Turner and Waterston who have placed Olixon Cameron in the Rhopalosomatidæ.

Key to the Genera of Rhopalosomatidæ.

1. Abdomen subsessile, the first segment two or three times as long as broad at apex; tarsal claws of female simple, not toothed beneath; spurs of hind tibiæ of male of equal length, their tarsi without strigil; nervulus strongly antefurcal. Type: *Rhopalosoma abnorme* Cameron
Hymenochimæra gen. nov.

Abdomen petiolate, the first segment four to six times as long as broad at apex; inner spur of hind tibiæ of female much longer than the outer, their tarsi with a well developed strigil; nervulus strongly postfurcal. . . . . .2.

2. Nervulus oblique, nearer to the basal vein than to the upper angle of the second discoidal cell; radial cell in hind wing truncate at base, the first section of the radiu sperpendicular to the costa . . . . *Paniscomima* Enderlein

Nervulus not nearer to the basal vein than to the upper angle of the second discoidal cell; radial cell in hind wing obliquely rounded at base, the first section of the radius curved below toward the apex of the wing
Rhopalosoma Cresson

THE DISTRIBUTION OF *MUSCINA PASCUORUM* MEIGEN IN AMERICA.

By Charles W. Johnson,

Boston Society of Natural History.

The last report on the distribution of this fly in North America was for 1923 (Psyche, vol. 31, p. 17, Feb. 1924).

During 1924 the fly was apparently quite scarce in the vicinity of Boston and no additional records bearing on its distribution were received. Mr. R. C. Shannon however reported one specimen (♀) from Plummers Island, Md., Nov. 11, 1923 (Ent. News, vol. 35, p. 104, March 1924) and common in cupolas (all females) at South Poland, Maine, May 1924 (Proc. Ent. Soc. Wash., vol. 26, p. 146, May 1924).

During the fall of 1925 after the rains in September it again appeared in eastern Massachusetts and I began to receive reports of its entering houses in considerable numbers. During the first week in October a few appeared each day on the windows at the museum and at my home in Brookline. Mr. N. P. Woodward sent me specimens from Worcester, Mr. D. S. Lacroix reported it common at the State Cranberry Station, East Wareham. Mrs. Hathaway sent me specimens on October 10 from East Bridgewater. Dr. Francis Harper collected a number at Natick, October 16. Mr. W. L. Maxcy sent me a number from Still River, October 20 and Mr. F. W. Walker found it common in a cottage at Middleton, Nov. 15. My friend, the late Lewis B. Woodruff wrote me Oct. 19 that it was plentiful on his windows at Litchfield, Conn. Mr. N. K. Bigelow informs me that it is now common in parts of Ontario and sent me specimens collected at Port Hope, Sept. 5, 1925.

Dr. A. H. Sturtevant in a letter dated October 17, 1925 says—"I have just noticed that your friend *Muscina pascuorum* is now common on the windows here. I have never seen it in New York [City] before, but cannot guarantee that it has not been fairly common before since I do not check up carefully on Calypteræ."

Later he writes—"I found *Muscina pascuorum* in an attic at Morristown, N. J., Oct. 19, 1925, I have seen no males, but two females from New York and one from Morristown, that I dissected, all had active sperm in their receptacles. Evidently the females mate before they come indoors to hibernate."

The distribution of this species is probably much greater than has been recorded. It is readily overlooked as many of the species of Muscidæ are similar in appearance and have the same habit of entering houses as the weather becomes cool in the fall. Its life history in America is still unknown.

RECENT WORK BY GABRITSCHEVSKY ON THE INHERITANCE OF COLOR VARIETIES IN *VOLUCELLA BOMBYLANS*.[1]

By Clyde E. Keeler.

The large syrphid flies of the genus *Volucella* have long been in taxonomic confusion due to their great variation in Color. In Europe there are several forms which closely resemble certain species of bumble-bees and as the flies are parasitic in the nests of these bees, the color varieties have taken on considerable significance on account of their apparent mimetic resemblance to the specific bees on which they are parasitic.

Recently Gabritschevsky[2] has reported on a number of crosses between three varieties and has shown that they bear a Mendelian relation to one another something like that found by De Meijere[3] to exist between the forms of polymorphic *Papilio memnon* in Java.

While I do not share the belief that a Mendelian analysis eliminates the problems of mimicry and protective resemblance, by causing them to disappear, I do maintain that proof of such an hereditary status sheds much light in the proper direction of a solution and suggests a possible mode of attack upon allied problems in these fields.

As early as 1901 a mating pair of *Volucella bombylans* var. *bombylans* and *Volucella bombylans* var. *plumata* was reported by Verrall.[4] It is quite probable that there is free interbreeding between these as well as other color varieties of this species.

Gabritschevsky has worked with a very difficult material and has obtained results of great merit. However, he has hardly done justice to himself or his material, for although he tabulates the data and shows that they may all fit a simple Mendelian scheme, yet he does not attempt to show the snugness of this fit. This I have tried to do, for one is not content with knowing that an hereditary formula may be applied successfully, but desires as well to know the probability of its being the most exact interpretation possible for the given facts. It is when too many multiple factors, lethals, normal overlaps, distorted chromosomes and the like must be resorted to to elucidate materials of great complexity and difficult handling, that many workers take leave of this form of analysis.

---

[1] Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, no. 259.

[2] Gabritschevsky, E. Farbenpolymorphismus und Vererbung mimetischer Varietaten der Fliege *Volucella bombylans* und auderer "hummelahnlicher" Zweiflügler. Zeitschr. f. indukt. Abstamm. u. Vererbungslehre, Vo. 32, 1924, pp. 321-353.

[3] Meijere, J. C. H. de, Uber Jacobsons Züchtungsversuche bezüglich des Polymorphismus von *Papilio memnon* L. ♀ und über die Vererbung sekundarer Geschlechtsmerkmale. Zeitschr. f. indukt. Abstamm. u. Vererbungslehre,

[4] Verrall, British Flies, Vo. 8, p. 485. London, 1901.

The data under consideration show results of matings between the three varietal forms, *bombylans*, *hæmorrhoidalis* and *plumata*. There are eighteen matings in which both parents are known and twelve in which the mother only was observed. According to the Mendelian scheme as given by Gabritschevsky there are twenty-one different genetic types of matings possible.

Among the forms considered there are two pairs of alternatives. Either the thorax and base of abdomen are black or they are yellow with a rusty red tinge on the central portion of the mesonotum. The fourth abdominal segment is either rusty red or white.

The black thorax and red abdomen are characteristic of *bombylans*. The yellow thorax and red abdomen distinguish *hæmorrhoidalis* from *plumata* which bears the yellow thorax and white abdomen.

The fourth possible combination, that of a black thorax and white abdomen does not appear in nature. This may be taken to mean that the presence of a black thorax tinges the abdomen regardless of those factors affecting it specifically. True it is that there is variation in intensity of the rusty red abdominal color in *bombylans*. Such a condition would give us reasons for at least three such variations according to whether the specific color factors which the animal contained were homozygous for red, for white or heterozygous for both.

In Kurst Stad (Russia) the three color varieties are distributed in the proportion of 50% b; 20% h; 30% p. If we assume distribution and equal interbreeding of all the genetic types (given in Gabritschevsky's Table II) we may expect animals appearing in the proportion of the three types shown in the table. If we convert the tabular figures into percentages we find that they give us an expectation of *about* 53% b; 14% h; 33% p. However, these ratios will shift from year to year in nature and instead of having equal numbers of six genetic types the second year to breed from there will be six types in the ratios (6+17+17) *bombylans*, 7 *hæmorrhoidalis*, 16+6 *plumata*, causing the gradual piling up of the heterozygous classes.

The percentages for the region near Moskow are also given. It is marked by a dearth of the dominant *bombylans*. These are 20% *bombylans*, 30% *hæmorrhoidalis*, 50% *plumata*. A shift caused by interbreeding could not take care of these ratios. True it is that the presence of even 20% *bombylans* will distort the relative appearance of *hæmorrhoidalis* and *plumata* types. If, however, we neglect this and compute the percentages for the two varieties of yellow thoraxed flies observed, we find that about 62.5% of them were p. and 37.5 were *hæmorrhoidalis*. When we consult the table mentioned above and classify the animals resulting from yellow thoraxed parents we find that we should expect 70% *plumata* and 29.1% *hæmorrhoidalis*.

The above is entirely a theoretical consideration. Actual numbers are not given in the text. Percentages for these two places only are given. It is unknown whether or not these percentages were based on fair samples of the population.

I prefer to use Mendel's type of formulæ for simplicity's sake.

Let Y = black thorax
y = lack of black thorax=yellow thorax
W = white abdomen
w = lack of White abdomen=red abdomen

Then a *bombylans* may be:

YYww		*YYWW*
Yyww	possibly	*YYWw*
		YyWW
		YyWw

A *plumata* is:

yyWw
yyWW

A *hæmorrhoidalis* is:

yyww

Bombylans and *plumata* may or may not breed true, but *hæmorrhoidalis* always does.

The simplest expianation is that the combinations of thorax and abdomen are closely linked or that the three color phases are allelomorphic.

If we classify the recorded matings by the types or classes of offspring produced we find that the results fall readily into one or more of the twenty-one theoretical combinations.

There is a single exceptional individual. It is in the case of a *hæmorrhoidalis* male appearing in what should be a *plumata* group only. It may be an individual variation resmbling *hæmorrhoidalis* or a case of mutation. Non-disjunction and contamination might account for its appearance. It might be a badly distorted ratio, for one possible mating could produce these in the proportion of 3:1. In a number of instances only a single type of mating can account for the results obtained. In others several combinations could have produced the observed classes in the same proportions. It is impossible to distinguish between homozygous and heterozygous dominants in either parents or offspring unless a very detailed genetic study could be successfully carried out.

If we consider that those matings which produced like results in the F_1 were identical, although in a few cases there is a chance to the contrary, we may combine these data. We may then calculate the expectancy under such conditions. The calculated sizes of the classes expected may then be compared with the numbers of individuals in each class actually obtained.

Upon comparing the expected values with the numbers observed, it is evident that there is a much better agreement than could possibly be found due to chance alone.

Let us now examine these results as I have analysed them by the statistical method.

TABLE I.

Matings Combined	Probable type of Mating	Expected	Found	Deviation divided by probable Error	Probable occurrence of such deviations due to chance alone during 100 repetitions of the same experiment, other things being equal.
1, 2, 3, 4	3, 11, 12, 15, 17, 18	83.5:27.5	82:29	0.4	
5	1, 7, 8	17.5:17.5	19:16	0.7	
6, 7, 8	2	34.5:11.5	36:10	0.7	
10, 11	9	16:0	16:0	0.0	
12	5	17:17	11:23	3.0	4.3
9, 13, 14	13	25.5:25.5	25:26	0.004	
15	4	16:0	16:0	0.0	
16? 17? 18?					
19, 23, 24	18	46:46	52:40	1.8	22.47
20, 21, 25, 26, 27, 28	6, 20, 21	47:0	46:1	cannot be calculated	
22, 29, 30	19	46:46	46:46	0.0	

In this analysis I have accounted for some 540 individuals resulting from 27 matings. I have omitted three matings (Nos. 16, 17 and 18) in which we cannot be sure what the parents were genetically and in which we cannot recognize the ratios definitely.

The results from a mathematical standpoint are close approximations of those expected. The highest deviation from the expected for any group is barely three times the probable error. This, from a statistical point of view, is probably insignificant. The same deviation would be expected under normal conditions of chance 4.3 times in 100 repetitions of the same experiment, other things being equal.

It is to be desired that a test of this kind be applied to the American relatives of these flies, for it is quite probable that their differences may have a similar hereditary basis.

Conclusion.

The results obtained by Gabritschevsky in studying the relationships between *Volucella bombylans*, var. *bombylans*, *V. b. plumata* and *V. B. hæmorrhoidalis* agree very closely with ratios expected upon a mendelian interpretation, a condition hardly to be predicted from an undetailed perusal of the genetical data as presented by this experimentor.

BOOK REVIEW.

Manual of Injurious Insects, By Glenn W. Herrick. Henry Holt & Co., New York City, 1925. $4.50.

This is a book of 489 pages including its index, with 458 text-figures. It deals mainly with the more abundant North American insects that affect agricultural crops although there are short chapters dealing with the parasites of poultry and livestock and a few words on the relation of insects to human and animal diseases. It includes also a rather elaborate consideration of insecticides and the machinery for applying them. Forest insects are entirely omitted.

The several pests are dealt with *seriatim*, classified according to the crops upon which they feed. For each species there are paragraphs entitled "Description: Injury; Life history, and Control measures," together with a figure of the insect or its work and a list of such useful practical literature as has been published by the Federal government and the various state agricultural experiment stations. Less common pests are listed by their common and scientific names with references to economic literature.

Professor Herrick's book forms a useful compendium and with its abundant references will also furnish a key to the literature for those who wish to learn more concerning certain species.

Due to the present unrest in nomenclature many unfamiliar generic and specific names appear in the text. Unfortunately some of these changes have been so rapid that the gender of the generic names has not even been noticed and we see such barbarisms as *Eriosoma lanigera, Eccoptogaster rugulosus*, etc. Although great attention seems to have been given to the use of most "up to date" names, the brown-tail moth still appears as *Euproctis chrysorrhœa*, which well illustrates the difficulty experienced by all who attempt to keep up with the gyrations of the research worker in nomenclature!

C. T. Brues.

Exchange Notice.

Wanted. American Lepidoptera, especially moths, including *Sesia* and the Microlepidoptera. European Lepidoptera offered in exchange. Dr. A. Schmidt, Ungarisches National Museum, Budapest 80, Hungary.

PIN-LABELS IN MULTIPLES OF 1000, ALIKE
ONE DOLLAR PER THOUSAND

Smallest Type. Pure White Ledger Paper. Not over 4 Lines nor 30 Characters (13 to a line) Additional Characters, 3 cents each, in total and per line, per 1000. Trimmed so one cut makes a label.

C. V. BLACKBURN, 7 Emerson St., STONEHAM 80, MASS.

CAMBRIDGE ENTOMOLOGICAL CLUB

A regular meeting of the Club is held on the second Tuesday of each month (July, August and September excepted) at 7.45 p. m. at the Bussey Institution, Forest Hills, Boston. The Bussey Institution is one block from the Forest Hills station of both the elevated street cars and the N. Y., N. H. & H. R. R. Entomologists visiting Boston are cordially invited to attend.

We are the Headquarters for Entomological Supplies and Specimens.

Special attention is called to our hand made Schmitt boxes.

American Ent. Co. Steel Pins, Klaeger Pins, Life Histories of Beneficial and Injurious Insects, Type, Mimicry and Protective Coloration Collections; also Collections of Household, Garden, Orchard, Forest and Shade Tree Pests. Living Pupae from November to March.

Exotic Insects of different orders; also Biological material for dissection.

Catalogue No. 33, Entomological Supplies, free on application.

WARD'S NATURAL SCIENCE ESTABLISHMENT
84-102 College Ave., Rochester, N. Y.